CLAIMS

1. A liquid crystal device comprising a first cell wall and a second cell wall enclosing a layer of liquid crystal material;
electrodes for applying an electric field across at least some of the liquid crystal material; and a surface alignment structure on the inner surface of at least the first cell wall providing a single desired alignment to the liquid crystal director, wherein the said surface alignment structure comprises a two dimensional array of upstanding features which are shaped and/or orientated to produce the desired alignment; but not including any device in which the surface alignment structure comprises a sinusoidal bigrating.

2. A device as claimed in claim 1, wherein the features have a height in the range 0.5 to 5 μm.

3. A device as claimed in claim 1, wherein the features have a height in the range 1.0 to 1.2 μm.

4. A device as claimed in claim 1, wherein at least part of a side wall of the features is tilted with respect to the normal to the plane of the first cell wall.

5. A device as claimed in claim 1, wherein each feature has a width in the range 0.2 to 3 μm.

6. A device as claimed in claim 1, wherein the features are spaced from 0.1 to 5 μm apart from each other.

7. A device as claimed in claim 1, wherein the liquid crystal material contains a surfactant.

8. A device as claimed in claim 1, wherein the features are formed from a photoresist or a plastics material.

9. A device as claimed in claim 1, wherein the features are of different height, different shape, different tilt and/or different orientation in different regions of the device.

10. A device as claimed in claim 1, wherein the upstanding features are formed from a photoresist material or a plastics material.

11. A cell wall for use in manufacturing a liquid crystal device according to claim 1, comprising a wall and an alignment structure on one surface thereof for providing a single desired alignment to the director of a liquid crystal material, the said alignment structure comprising a two dimensional array of upstanding features which are shaped and/or orientated to produce the desired alignment; but not including any cell wall in which the surface alignment structure comprises a sinusoidal bigrating.

12. A method of manufacturing a cell wall in accordance with claim 11, comprising applying a photoresist material to a surface of a wall, exposing the applied photoresist material to a suitable light source through a suitably patterned mask, removing soluble photoresist, and hardening the exposed photoresist material to produce a two dimensional array of alignment features on th wall; but not including any method which produces a

sinusoidal bigrating.

13. A method of manufacturing a cell wall in accordance with claim 10, comprising applying a plastics material to the surface of a wall, and embossing a two dimensional array of alignment features into the plastics material; but not including any method which produces a sinusoidal bigrating.

14. A method of manufacturing a liquid crystal device in accordance with claim 1, comprising securing a first cell wall in accordance with claim 13 to a second cell wall, so as to produce a cell having spaced apart cell walls; filling the cell with a liquid crystal material, and sealing the cell; wherein one or both of the cell walls have at least one electrode structure thereon so that the device has electrode structures for applying an electric field across at least some of the liquid crystal material.

15. A liquid crystal device comprising a first cell wall and a second cell wall enclosing a layer of liquid crystal material;
electrodes for applying an electric field across at least some of the liquid crystal material; and a surface alignment structure on the inner surface of at least the first cell wall providing a desired homeotropic or tilted homeotropic alignment to the liquid crystal director, wherein the said surface alignment structure comprises an array of upstanding features which are shaped and/or orientated to produce the desired alignment.

16. A device as claimed in claim 15, wherein the height of the features is at least equal to the average

spacing between the features.

17. A device as claimed in claim 1, wherein at least part of a side wall of the features is tilted with respect to the normal to the plane of the first cell wall.

18. A liquid crystal device comprising a first cell wall and a second cell wall enclosing a layer of liquid crystal material;
electrodes for applying an electric field across at least some of the liquid crystal material;
and a surface alignment structure on the inner surface of at least the first cell wall providing a desired alignment to the liquid crystal director in a single azimuthal direction, wherein the said surface alignment structure comprises an array of upstanding posts which are shaped and/or orientated to produce the desired alignment.

19. A device as claimed in claim 18, wherein the posts are tilted with respect to the normal of the plane of the first cell wall.

20. A device as claimed in claim 18, wherein each post is a discrete structure.

21. A liquid crystal device comprising a first cell wall and a second cell wall enclosing a layer of liquid crystal material;
electrodes for applying an electric field across at least some of the liquid crystal material;
and a surface alignment structure on the inner surface of at least the first cell wall providing desired alignments to the liquid crystal director in a plurality

of azimuthal directions, wherein the said surface alignment structure comprises an array of features which are shaped and/or orientated to produce the desired alignments, wherein the distortion energy of the liquid crystal material is not the same in all of the said azimuthal directions.

22. A liquid crystal device comprising a first cell wall and a second cell wall enclosing a layer of liquid crystal material;
electrodes for applying an electric field across at least some of the liquid crystal material;
and a surface alignment structure on the inner surface of at least the first cell wall providing desired alignments to the liquid crystal director in at least three azimuthal directions, wherein the said surface alignment structure comprises an array of features which are shaped and/or orientated to produce the desired alignments.

Add B5